



UNITED STATES PATENT AND TRADEMARK OFFICE

ven
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,748	10/17/2003	Don Carl Powell	M122-2157	3329
21567	7590	08/30/2006	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			EVERHART, CARIDAD	
			ART UNIT	PAPER NUMBER
			2891	
DATE MAILED: 08/30/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/688,748	Applicant(s) POWELL, DON CARL	
	Examiner Caridad M. Everhart	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6-7-2006 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 31, 50, and 51 are rejected under 35 U.S.C. 102(b) as being anticipated by Cho, et al. (US 2002/0127888A1).

Cho, et al discloses the steps of placing a substrate in a CVD chamber, as the disclosure that the method is CVD implies that a chamber is used(paragraph 0023), the substrate includes a layer of tungsten and a layer of polysilicon, which are both oxidizable materials(paragraph 0023), exposing the substrate to a mixture of oxidizer and reducer in order to carry out selective oxidation(paragraphs 0005 and 0009), in which the disclosure of wet hydrogen oxidation indicates that hydrogen and water are

Art Unit: 2891

used. There is a heat treatment in hydrogen atmosphere at a reduced partial pressure of the oxidizer by the flowing of nitrogen(paragraphs 0005, 0007, and 0008) and at a temperature at or above the oxidizing temperature(paragraphs 0028 and 0030 and 0031). The nitrogen is used during the heat step in order to change the partial pressure of oxidant(paragraphs 0013, 0028, and 0031). The disclosure that the nitrogen is flowed in order to control the partial pressure of the oxidizer and reducing gas implies that the pressure is at least as high as the reaction step, as the addition of nitrogen would not be expected to reduce the pressure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

Art Unit: 2891

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6-30, 32-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cho, et al in view of Joo, et al. (US 6,534,401B2).

Cho et al is silent with respect to the recited variations in reaction conditions and the rapid thermal processing.

Joo, et al discloses a process in the formation of a transistor(col. 7, lines 60-63) which includes the steps of placing a substrate in a reaction chamber(col. 2, lines 19-20); exposing the substrate to a gas mixture of hydrogen and oxygen(col. 2, lines 32-35) such that the ambient to which the substrate is exposed is a water/hydrogen mixture(col. 2, lines 35-40); the mixture is such and the conditions are such that the silicon portion of the electrode stack is oxidized while the tungsten upper portion of the electrode is not oxidized(col. 2, lines 38-44); once the process of growing oxide on the silicon layer has reached the desired thickness, the reaction is stopped by stopping the flow of oxidation process gases to the chamber and decreasing the temperature of the chamber(col. 7, lines 45-52 and col. 8, lines 17-23). RTP apparatus may be used(col. 2, lines 64-67). Joo, et al teaches that the reaction can be at atmospheric pressure(col.

Art Unit: 2891

7, lines 27-20) and that desired reduced pressures can also be achieved(col. 2, lines 63-67 and col. 3, lines 37-40).

Miner, et al disclose oxidation of silicon using an oxygen-containing gas and a hydrogen-containing gas(col. 2, lines 20-27 and 34-40). The oxygen-containing gas can be water in the form of steam(col. 5, lines 7-10), and the hydrogen-containing gas can be hydrogen(col. 5, lines 12-13). Miner, et al further disclose that in the temperature ramp-down or cooling step, simultaneously to the cooling, nitrogen gas is fed to the reaction chamber(col. 10, lines 64-67 and col. 11, lines 1-6). Miner, et al further discloses that hydrocarbons such as methane may be included as other hydrogen-containing gases in the mix(col. 8, lines 20-25). This would result in the mixture exposing the substrate to carbon dioxide and carbon monoxide, as the decomposition in the mixture at the elevated temperatures would result in CO₂ and CO. Miner also teaches that the oxidation gas can be void of inert(col. 7, lines 54-58) by teaching that the flow of inert is stopped. Miner also teaches that in the step of stopping the reaction, reaction gases can be stopped before the nitrogen is introduced(col. 11, lines 8-11). Miner also teaches the method as part of a process of forming transistors(col. 1, lines 55-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used RTP in the process taught by Cho as taught by Joo et al because Joo et al teaches that RTP may be used for the heat treating step of the selective oxidation of a gate, and because RTP is conventional anneal process in the art for heat treatment.

Art Unit: 2891

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the teachings of Miner, et al with the process taught by Cho because Miner et al teach the equivalence of hydrogen and hydrocarbons in the oxidation as the hydrogen source. This would also result in the substrate being exposed to CO₂ and the CO as products of decomposition at elevated temperatures. It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the recited pressure ranges because the pressure is a variable of the art which one of ordinary skill in the art would have been able to determine.

Similarly, with respect to reducing the flows of the oxidizer and other gases to zero, these variations are also within the ordinary skill in the art to control the order of turning off the process gases. In the absence of a showing of criticality of the order of turning off of the process gases, this would therefore have been an obvious variation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2891

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C. Everhart
CARIDAD EVERHART
PRIMARY EXAMINER

C. Everhart
8-27-2006